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Title: **Utensil, Sheath to cover or wrap a utensil, and  
methods for the production thereof.**

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Description

The invention concerns a utensil or a part thereof, which comes frequently into contact with human skin, as well as a sheath to cover or to wrap such a utensil. The invention further concerns a method for the production of such a utensil or sheath.

Utensils or parts thereof, such as for example door handles, door knockers, toilet seats etc, are in frequent and constantly changing contact with the skin of users. This is particularly the case in hospitals, motorway service stations, public offices, public toilets etc. It is known that the parts of devices which are frequently in skin contact are particularly active in the transmission of the causative agents of diseases from person to person. There is therefore a need to eliminate where possible the sources and causes of this transmission of disease.

The object of the invention is to provide a sheath of the type described above, in particular for door knobs and door handles, and further for toilet seats to so develop the art that the transmission of the causative agents of illnesses and/or fungal illnesses through sequential direct skin contact are substantially reduced.

This object is achieved by means of a sheath to cover or wrap a utensil or a part thereof, which comes frequently into touch contact with human skin, and a

carrier element, wherein according to the invention this carrier element comprises at least an outer active layer which contains an antiseptic or antifungal agent, which is non-irritant to the skin.

The advantages of the invention lie in particular in that items such as handles, door knobs, fixtures for the opening of a window, and toilet seats, are wrapped in a tightly enclosing sheath, and that the surface thereof which is touched by the user has an active layer and which has a non irritant antiseptic or antifungal agent, the touchable surface of the sheath is kept sterile and/or free of fungi. As a result of skin contact, a small quantity of the active ingredient located in the surface will be deposited on the skin of the user, so that a further sterilisation effect takes place there also. Those parts of the utensil which frequently come into contact with the skin are thereby kept relatively free from infection and/or fungi, such that the transmission of pathogens from a user to a following user are substantially reduced.

Preferably, the outer active layer consists of a porous material, in which pores the antiseptic or anti fungal agent is stored or absorbed. Furthermore, the outer active layer may be further covered with a protection layer of a porous material, which allows the active agent, such as the fungicide or bactericide to seep to the outer surface through its pores. The active layer preferably contains colloidal silver as an antiseptic agent. Silver functions, also in bound form, as a strong antiseptic, since silver ions, detached from the metal surface by oxidation, perform a blocking effect on the thiolenzyme of the microorganism. Silver is a particularly strong fungicide and bactericide in the ionic form. This preferred embodiment of the sheath is produced according to the invention by soaking the porous carrier element in sodium chloride solution and drying. The carrier element is then bathed in strongly diluted silver nitrate solution. A virtually insoluble silver chloride is formed thereby. This silver chloride is then reduced by means of a reducing agent, such as dilute photo developer, to colloidal silver which remains in the pores of the carrier element.

Alternatively, the sheath according to the invention can be further coated with an additional active layer. To this end for example, a gelatine solution is preferably mixed with a sodium chloride or potassium bromide solution. A dilute silver nitrate solution is then added. The gelatine acts thereby as a protective colloid. This mixture is applied on the carrier element, and is reduced after

hardening. Since the gelatine coating in this form is soluble in water, the sheath is then hardened in formaldehyde, such that it becomes insoluble.

The carrier element is preferably formed as a shaped body, the inner measurement of which corresponds essentially to the outer measurement of the part to be covered, and the outer surface of which carries the active layer, and is fitable to the part to be covered. The shaped body comprises for example a thin walled plastic material and can be removably, but sufficiently tightly fixed to door handle, door knob, window fitting etc. To increase adhesion, the inner surface of the shaped body can be provided with sticking zones or contact zones.

Alternatively, the carrier elements can consist of flexible strips, that preferably have an adhesive layer on the side away from the active layer. The sheath thus allows itself to be positioned on the part to be covered as an adhesive film. Since the quantity and effect of the antiseptic and/or antifungal agent are reduced over time, the desired effect of the invention is gradually lost. It is therefore advisable to replace used sheaths after a predetermined period of usage. The sheaths are therefore preferably made as disposable articles, which should be cheap and simple to produce and enable easy replacement.

Naturally other non irritant bactericidal agents can be used as alternatives, for example silver 8-hydroxosycinolyn. Replacement with 8-hydroxosycinolyn shows itself to be particularly effective.

In many cases however it is desirable that an element which comes into frequent contact with the skin should not be sterilised by means of a sheath or wrapping with an antiseptic surface. For various reasons, it can be more desirable that the utensil itself be constructed according to the teaching of the invention, so that the surface thereof is kept sterile and/or fungus free, so as to strongly limit as far as possible the transmission of pathogens through sequential direct skin contact.

The present invention therefore envisages utensils or parts thereof, which exhibit at least a shaped body which comes into contact with human skin, so constructed that the shaped body has at least an outer active layer, which contains a skin tolerable antiseptic and/or antifungal agent, so as to sterilise the outer surface thereof. This utensil realises all advantages embodied by the sheath according to the

invention. Thereby, by further applications of material through the sheaths the properties of the utensil remain without any modification. As soon as the effect of the active layer diminishes, because for example the active layer is worn out through use, or the active ingredients have lost their effect over time, the utensil can be replaced with a new corresponding utensil. In this embodiment of the invention, in which the utensil itself is provided with an outer active layer, has the further advantage that very small or complex utensils can be kept sterile or free of fungal agents in this way.

Utensils in which the teaching according to the invention is applicable, comprise for example all actuators for doors and windows, handles or all types, in particular for tools, power tools, domestic appliances etc, handrails, toilet bowls, as well as writing apparatuses, and further table or benches in particular in hotels, public offices etc.

Advantageous developments of the invention are defined by the features of the dependent claims.

An example of the invention will now be described in further detail with reference to the drawings. These show:

Figure 1 an enlarged cross-section through the wall of a sheath according to the invention;

Figure 2 a front view of a sheath in the form of a casing for a door knob;

Figure 3 a side view of the casing according to Figure 2; and

Figure 4 a cross-section through a further sheath, which can be used for example to cover a toilet seat.

Figure 5 and 6 a side view and a cross-section of a utensil according to the invention in the form of a door knob.

Figure 1 shows an enlarged cut-out from a sheath. The layer sequence of the detected exemplary shape can be clearly recognised. A carrier element 2 has an adhesive layer 8 on a surface abutting the part to be covered which can also be divided into individual separate areas. On the side of carrier element 2 opposite that of the adhesive layer 8, is arranged an active layer, which contains at least an antiseptic or antifungal agent. The active layer 4 can be produced by introducing the

selected antiseptic fungicide and/or bactericide to an outer edge of the carrier element 2, if this outer area of the carrier element 2 is sufficiently porous. Alternatively, the active layer can provide an additionally applied layer, which is additionally applied to the carrier element 2. A thin protection layer 6 which is formed of the porous material so as to allow the passage of the active ingredient from the active layer 4 to the surface 7 of this sheath is applied over the active layer 4. The carrier element 2 can be realised in the form of for example a flexible strip material, or as a thin wall of a plastic shape.

In Figures 2 and 3, a front view and a side view of the sheath 10 is shown, in the form of a insertion housing for a door knob or door handle. The carrier element 2 comprises a cylindrical housing open on one end, made from an elastic and flexible plastic. The housing 10 is closed at its other end. The inner diameter of the housing is so determined, that the housing lies tightly about the parts to be covered so that it can fitted to the door knob or door handle or where applicable the grip for a window fitting. The active layer 4, which holds the antiseptic or fungicide or bactericide lies on the outer skin of the shaped body 2. Colloidal silver is preferably used as an antiseptic, for example in the form of a silver nitrate solution washed into the pores of the outer skin of the shaped body 2. The porous outer skin of the shaped body 2 is soaked beforehand in a sodium chloride solution, the salt then forming a virtually insoluble silver chloride together with the in flowing silver chloride solution. The silver chloride is finally reduced to a colloidal silver via a reduction means, for example a diluted photo developer.

Figure 4 shows a cross-section through a further form of a sheath according to the invention. The carrier element 2 comprises however a shaped body, the cross-section of which is fitted to the outer cross-section of a toilet seat and at both ends comprises contact formations 12, which grip the part to be covered. The active layer 4, which contains the antiseptic and/or antifungal agent and by which the surface of the active layer and also by contact therewith the skin of a user is kept relatively sterile and free of fungi, is formed on the outer surface of the shaped body 10. The sheath shown in Figures 2 and 3 as well as 4 can easily be removed from the parts covered when the effect of the antiseptic agent is used up. The used sheath can then be replaced with a new one.